FACULTY OF COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY

STUDENT MANAGEMENT SYSTEM

BY
THEVAGI A/P SANDRASECRA
WEK 98059

University of Malaya

TABLE OF CONTENTS

University of Malaya

Chapter 2 – Literature Review

University of Malaya

Chapter 3 – System Analysis and Methodology

Chapter 4 – System Design

University of Malaya

Chapter 5: System Implementation

University of Malaya

Chapter 6: Testing

Chapter 7: System Evaluation

University of Malaya

University of Malaya

ACKNOWLEDGEMENT

I would like to take this opportunity to acknowledge everyone who has helped me along the way to complete my project successfully. Without all of yours contribution I would not be able to complete this project that I have undertaken on time.

First of all, I would like to extend my appreciation to my supervisor ***Pn. Abrizah*** for all the guidance that she has given me. Thank you for being patient with me and taking the time to clarify things that I do not understand and also for pointing out the things that I could improve in my overall project preparation. Next, I would like to thank ***En. Ali Fauzi*** as my moderator for all the advice and the guidance that has been given.

My appreciation also goes for my friends who are undertaking this same topic as me that is Miss Melissa and Miss Madhavi. Thank you very much for standing by me and giving me support in my time of need. Thank you again for all the information and help that was given to me during this course of project completion.

I would also like to thank my parents, my housemates and all of my friends who in their own way has contributed some valuable help to me for the successful completion of *Student Management System*. **Thank you**.

University of Malaya

ABSTRACT

Overall, it can be said that this project is really important for the administration of students in the school. This system in general requires the retrieval, analysis and reporting of student's records. Other than that, this system also enables the teachers to tap into the students information system without the hassle of going through student's manually written records. The manually written record is very hard to locate and it is very time consuming and tedious procedure to be contemplated.

Student Management System is really a feasible tool since it boasts the usage of electronic database. It is a system that will create a faster access to student's records, speedier retrieval, less redundancy and is able to use high volume application. It again could be said that this system is very easy to navigate and could lessen the burden of the school administrator's workload.

University of Malaya

LIST OF FIGURES

University of Malaya

LIST OF TABLES

University of Malaya

INTRODUCTION

1.1. Introduction

Student Management System is a set of information system that deals with management of student's information. This system contains students data profile, students processing and registration records, parents or guardians records, academic reports, students performance charts, compilation of teacher's feedback pertaining students, input, retrieval, analysis and reporting of student's data according to their age, sex, race, religion, economic and social status among others. Information on school facilities that are being used by students such as textbook loans or SBPT (Skim Buku Pinjaman Teks), scholarships; boarding accommodation and RMT (Rancangan Makanan Tambahan) are also considered. Student's attendance and participation in extra-curricular activities, medical records, discipline records, counselor records are also included in this system. The system is able to provide or generate reports and testimonials for each student when it is in need.

1.2. Project Background

In general, it could be said that Student Management System is a system that is developed for the usage of the school administration to lessen their burden in student's registration. This burden is very much prominent during the school-opening season where the manual filing for the student's registration has to be done. This is not a feasible method for keeping records. This is because if the number of files is in small quantity then it is agreeable but if the number of files is big then this will surely create a problem in locating the files. To overcome this problem the Student Management System will come into the scene.

1.3. Definition of Project

Basically, this project deals with the development of students management system. This system is needed to compile every record of students and for easier retrieval and analysis. The informations provided by the system are as follows:

- Student data profile
- Student registration record
- Parent or Guardian record
- Academic record
- Teacher's feedback

University of Malaya

- SBPT
- Scholarships
- Boarding accommodation
- RMT
- Student attendance
- Extra-curricular activities
- Medical record
- Discipline record
- Counselor record
- Generate testimonials and official letters

This project is undertaken by three persons. This project has been divided into 3 modules, as the topic is quite wide and covers quite a number of input forms. The modules are as follows:

a) Student Affairs

b) Curicullum

c) Extra-curricular activities

These three categories will be treated as three separate modules. These three modules will be inter-related based on a primary key in each module. The primary key will be determined later on during the project implementation phase. The module that I am responsible for is the third module concerning student

University of Malaya

extra-curricular activities and the boarding facilities and accommodation. This module will be explained in depth in the following section.

1.4. Project Overview

This system in general requires the retrieval, analysis and reporting of student's records. This system is applicable to every student that has been formally enrolled in schools. This student's registration numbers and every record that usually will be filed manually by the teachers will be recorded on a database that will be created. This system also enables the teachers to tap into the students information systems without the hassle of going through the particular student's manually written records.

This manual process is tedious, and is a very time consuming procedure. The manual filing system works well while the number of items to be stored is small. It even works quite adequately when there are quite a large number of items and we have to store and retrieve them. However, the manual filing system breaks down when we have to cross-reference or process the information in the files. Even if the files of the student's are found, sometimes it is hard to read the handwriting of certain teachers. Overall, it can be said that filing student's information system manually is not a feasible process. Meanwhile the

University of Malaya

computerization and creation of a *Student Management System* is a very good solution for this problem.

This system would enable the teacher a very fast access to the students information systems. All the information that will be required of teachers regarding students, such as student profiles, academic records, extra-curricular activities, medical records among others can be easily retrieved and analyzed by teachers. Other than that, any reports or letter would be able to be generated from the system itself. The security aspects also can be considered, where only the school administration are able to make any changes on the student's data. This is to ensure that the safety and integrity of the data are secure and only authorized personnel could modify or reach the system.

So far, it can be concluded that *Student Management System* strives to make the administration system of the student's information much easier and approachable for the teachers.

1.5. Project Objective

An objective is defined as something external and actually exists or exhibiting facts uncolored by feelings or opinions and it is not subjective. Project

University of Malaya

objectives primarily refers to the requirements and what is set to be accomplished by building this *Student Management System*. Objectives of a certain project is important as it will set the system developer on the right path and clear view of the outcome on the completion of the intended system. The project objectives also would give the user perspectives and highlight the advantages of the system. The project objectives must be realistic and measurable, where the reason of its development is to build a database on the profile of students.

This is necessary, as the reasons for the students management system to be developed should be pinpointed in the project objective itself. It gives a quick guide on the feasibility of the *Student Management System*. Listed below are a few of the objectives of this project:

(i) ***Easier access*** since information regarding students can be retrieved whenever it is required and in unlimited number of times by the school administration.

(ii) ***Speedier retrieval*** where information can be accessed and retrieved in a very high speed and it is not time consuming, thus saving valuable times.

(iii) ***More efficient and effective*** service can be provided for the convenience of the school administration thus eliminating need for manual filing.

University of Malaya

(iv) ***Less redundancies*** where insignificant data can be omitted. This will eventually lead to data integrity and reliability since all the students' records are integrated.

(v) ***Faster*** and more ***accurate referencing***.

(vi) ***High volume application***, where a database can store large volumes of data vital to operate the management of students.

1.6. Project Scope

The project scope refers to the extent to which it is possible to range the project. It also defines the limitations of the system. The modules that are being developed are about student's involvement or participation in extra-curricular activities. The project scope consists of updating data of the students by the school administrator, such as add record, delete record, save record, locate record, go to the first record or the last record and going to the before and after record. The extra-curricular activities can be categorized into three categories. The three categories are as follows:

(i) Academic and Hobby Club

(ii) Uniform Bodies

(iii) Sports

University of Malaya

Each one of these three scopes would be explained briefly.

1) Academic and Hobby Club

This is a part of extra-curricular activities that have to be joined by every student in the schools. There are a number of academic and hobby club that is available in schools throughout our country. The scope for this category depends on the clubs that has already been established in the schools previously. Examples of academic clubs are such as:

- Mathematics Club
- Geography Club
- Science Club

whereas Hobby Clubs are such as:

- Chess Club
- Computer Club

2) Uniform Bodies

Uniform Bodies are also one of the extra-curricular activities that are available in all of the schools. The uniform bodies consist of member who wears distinctive clothing in significance of the body or association they are

University of Malaya

adhered too. The scope for uniform bodies is again constrained by the school. Examples are such as:

- Red Crescent Society
- Girl Guides
- School Choir

3) Sports

Sports activities are universal, where it is necessary have activities in every school. There usually will be sports day held annually in every school. Each student will be assigned to a particular sports house. Usually sports activities are given priority among any other curricular movements. There will be tournament held among the sports houses in the schools. With the *Student Management System*, it would enable to store every achievement by students in a very integrated manner.

Other than that, the scope of the system also covers the boarding accommodation for students. Usually boarding accommodation are only provided for students who have to travel far in order to get to school. There is also, a full boarding school system or more known as fully residential schools. Here, the management system is exactly the same as the normal schools, but the only difference would be that all the students in the fully residential school are

University of Malaya

staying within the school compound, where the input will be regarding the boarding accommodation. The system being developed will also cater for the needs of fully residential schools administration workforce. When boarding accommodation are taken into consideration, other requirements such as scholarships, discipline records, medical records and the room that they are residing among others have to be monitored throughout their schooling time in the schools.

1.7. Importance of Project

The project importance will enable a clear perspective or view on the reasons of the development of *Student Management System*. The development of the system is in a right time as a support for the achievement of Vision 2020, using technologies as a critical enabler in school administration areas. This system will prove to be concrete solutions in education environment in the near future.

It is a well-known fact that there is an exciting development in the education system in our country. One of it, is the creation of Smart Schools. Smart Schools are being planned in stages nationally to create a new generation of students; students who are more creative and innovative in their thinking,

University of Malaya

adept with new technologies and being able to access and manage completely the information explosion. The term Smart School itself generally is used to refer to schools that have applied information technology to various aspects of schooling such as teaching and learning, staff training and the focus here is obviously the ***management***. Below is an extract regarding the Smart Schools:

> *"An exciting development of our education system is the creation of Smart Schools. Smart Schools are being planned in stages nationally, not only to meet the requirements of the Multimedia Super Corridor, but also to create a new generation of Malaysians – Malaysians who are more creative and innovative in their thinking, adept with new technologies, and able to access and manage completely the information explosion".*
>
> *Dato' Sri Mohd. Najib Tun Haji Abdul Razak*
> *The Minister of Education, Malaysia*

Although Smart Schools are still in the implementation phase, it is important for the school administration to start computerization of their system from now itself. With *Student Management System* for students, the management related factor of the school can be tackled and be prepared from now onwards to meet the requirements of the Smart Schools later on. With this, the schools will

University of Malaya

be better prepared as the government envisages, that all schools in Malaysia will be converted to Smart Schools by the year 2010.

With this system too, the administartion system will enable the school administrator to efficiently and effectively to manage resources and the processes of students intake and students current affairs in schools will be kept up to date.

Malaysia's National Philosophy of Education

"Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, to produce individuals who are intellectually, spiritually, emotionally, and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysia citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high-levels of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large."

"Education in Malaysia", 1993

Other than that, there has been ongoing battle on the management of paper-based document in most organization areas. Papers will be filed eventually

University of Malaya

but because of this, papers are clustered everywhere and sometimes it will create quite a stir to locate papers that has not been filed accordingly. Nowadays there is talk on creating paperless organization, where every business transactions or recording of data will be done electronically. As time changes by, this method is gaining momentum and is being used widely in all organization.

The paperless organization is still a dream, but the basic tolls are already falling through. Schools basically are still doing their filing system of student's record manually. This method are very time consuming and not effective and efficient enough. The probabilities of misplacing the student records are very high. With this, *Student Management System* every record of the students would be recorded into the database and can be easily retrieved when it is needed and the information retrieval will be speedier.

1.8. System Requirements

This *Student Management System* for students is being done in Windows environment. In order to develop a system, appropriate tools and suitable languages are needed to code the programs. Choosing the suitable hardware and software could speed up system development.

1.8.1 Hardware Requirements

The hardware specifications used to develop the system are:

- Processor: Pentium 166 or above
- Memory: 32 MB or above
- Hard-disk: 800 MB or above
- Keyboard and mouse as input device
- VGA monitor

1.8.2. Software Requirements

The following are the software specifications to develop the system:

- Microsoft Access 2000

  Microsoft Access is the relational Database Management System used to create relational databases. Together with the ODBC driver for Microsoft Access, data can be retrieved from the database in Clint-Server based system. Microsoft Access 2000 was also chosen in view of its scalability, high performance and tight integration with the Windows environment.

- Visual Basic 6.0

University of Malaya

Using Visual Basic 6.0 is the quickest and easiest way to create powerful applications for Windows operating system. The Visual Basic programming system allows the creation of robust and useful application that fully make use of the Graphical Unit Interface (GUI).

1.9. Project Schedule

A project planned undertaking of scheduled activities and its management to reach a goal. A project schedule is a detail description of what is to be done. Each project activity, the use of personal and other resources and expected completion dates are described. Since a project may involve extensive efforts, it must be properly managed. Project management is the coordination of all aspects of a project so that it can be completed under the constraints defined. Figure 1.1 presents the schedule for this system in order to meet the project milestone and due date and create a systematic development of the project.

University of Malaya

D	Task Name	Start Date	End Date	2000							2001
				Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan
1	Literature Review	16/7/00	18/7/00								
2	Requirements Analysis	18/7/00	26/8/00								
3	System Design	26/8/00	30/9/00								
4	Module Development	30/9/00	1/1/01								
5	Integration Testing	1/1/01	15/1/01								
6	System Testing	15/1/01	20/1/01								

Figure 1.1 SMS Project Milestone

1.10. Summary

The overall picture regarding the project and the Student Management System explained briefly in this chapter. It covers the project requirements, project objectives, proj scope, project importance, the system requirements and the project schedule to complete system. Chapter 2 will be discussing about the literature review, where all the limitations manual filing and comparison with previous system are done.

University of Malaya

LITERATURE REVIEW

2.1. Introduction

This system in general requires the retrieval, analysis and reporting of student's records. This system is applicable to every student that has been formally enrolled in schools. This student's registration numbers and every record that usually will be filed manually by the teachers will be recorded on a database that will be created. This system also enables the teachers to tap into the students information systems without the hassle of going through the particular student's manually written records.

This manual process is tedious, and is a very time consuming procedure. The manual filing system works well while the number of items to be stored is small. It even works quite adequately when there are quite a large number of items and we have to store and retrieve them. However, the manual filing system breaks down when we have to cross-reference or process the information in the files. Even if the files of the student's are found, sometimes it is hard to read the handwriting of certain teachers. Overall, it can be said that filing student's information system

University of Malaya

manually is not a feasible process. Meanwhile the computerization and creation of a *Student Management System* is a very good solution for this problem.

This system would enable the teacher a very fast access to the students information systems. All the information that will be required of teachers regarding students, such as student profiles, academic records, extra-curricular activities, medical records among others can be easily retrieved and analyzed by teachers. Other than that, any reports or letter would be able to be generated from the system itself. The security aspects also can be considered, where only the school administration are able to make any changes on the student's data. This is to ensure that the safety and integrity of the data are secure and only authorized personnel could modify or reach the system.

So far, it can be concluded that *Student Management System* strives to make the administration system of the student's information much easier and approachable for the teachers. The introduction of computers in schools has taken place in the early eighties itself. Since then, Education Ministry has taken various steps in ensuring that every school will be provided with computers.

The available procedures that can be noticed in the schools in Malaysia are the manual procedure. The following section discusses the shortcomings of the manual procedure and the file-processing system.

University of Malaya

2.2. Manual Procedure

Manual filing system is one of the system that we are all familiar with. For example, in an organization a manual file is set up to hold all external and internal correspondences relating to a project, product, task, client or employee. Typically, there are many such files, and for safety they are labeled and stored in one or more cabinets. For security the cabinets may have locks or may be located in secure areas of the building. When we need to look for something up, we go to the filing system and search through the system starting from the first entry until we find what we need. Alternatively, we may have an indexing system that helps us to locate what we want more quickly.

The manual filing system works well while the number of items to be stored is small. It even works quite adequately when they are large numbers of items and we have only to store and retrieve them. However, the manual filling system breaks down when we have to cross-reference or process the information in the files. Manual filings are very tedious and time consuming. The data will not be integrated. A number of records will have to be searched to come up with the correct records. Sometimes, the data availability also can be questioned. There are big possibilities of data or record that is missing or had been misplaced. Manual recording procedure is the method that is being used by

University of Malaya

school administration here in Malaysia. In a short term wise, this application is considered satisfactory, but problem may arise in a long-term approach as the number of record and files will be mounting.

2.3. File Processing Systems

The best way to understand the general nature and characteristics of databases today is to look at the characteristics of systems that predated the use of database technology. The first business information systems stored groups of records in separate files and were called file-processing systems. Majority of schools in Malaysia still uses the manual record keeping system and does not use this method. This method is really not a feasible solution for a fast and easy retrieval of data. File processing systems are a great improvement over manual record keeping systems, but then the school system in Malaysia did not implement the usage of file processing systems. Still, file-processing systems have important limitations:

(a) Data is separated and isolated

Since, there will be a few files that is separated according to the files function, the data that need to be extracted from two files and later combined into a single file will take time and proves to be a very tedious process. First, systems analysts and computer programmers must determine which parts of

University of Malaya

each of the files are needed; then they must decide how the files are related to one another; last they must coordinate the processing of the files, so that the correct data are extracted.

(b) Data duplication

A student's data such as name and address may be stored many times. Although these duplicate data waste file space, that is not the most serious problem rather the most serious problem with duplicated data concerns data integrity. A collection of data has integrity if the data is logically consistent. A small change in data may cause discrepancies among them.

(c) Application Program Dependency

With file processing, application programs depend on the file formats. Usually in file processing systems, the physical formats of files and records are part of the application code. The problem with this arrangement is that when changes are made in the file formats, the application programs also must be changed.

(d) Incompatible Files

One of the consequences of program data dependency is that file formats depend on the language or product used to generate them. Thus, the format of a file processed by a COBOL program is different from the format of a file

University of Malaya

processed by a BASIC program, which is different still from the format of a file processed by a C program. As a result, files cannot be readily combined or compared. We would need to convert both files to a common structure before we could combine the records.

The following section will discuss the computerized database, which was a big improvement compared to the previous two procedures.

2.4. Database Processing Systems

Database technology was developed largely to overcome the limitations of file processing systems. File processing programs directly access files of stored data. In contrast, database-processing programs call the database management system to access the stored data. This difference is significant because it makes the application-programming job easier; that is, application programmers do not have to be concerned with the ways in which data are physically stored. Rather they are free to concentrate on matters important to the user instead of matters important to the computer system.

(a)Integrated Data

University of Malaya

In a database system, all the application data is stored in a single facility called the database. An application program can ask the database management system to access student data or profile data or both. If both are needed, the application programmer specifies only how the data are to be combined, and the database management system performs the necessary operations to do it.

(b) Reduced Data Duplication

With database processing, the duplication of data is minimal. When data are modified, only one update is necessary. Because data are stored in only one place, data integrity problems are less common; there are fewer opportunities for discrepancies among multiple copies of the same data item.

(c) Program / Data Independence

Database processing reduces the dependency of programs on file formats. All record formats are stored in the database itself, along with the data and they are accessed by the database management system, not by applications programs. Database application programs need not include the form at of all the files and records they process. Instead application programs must contain database. The database management system maps the data items into records and handles other similar transformations.

University of Malaya

2.5. Management at School levels

At the school level, the principal or headmaster is responsible for managing the school in all areas. The principal is usually assisted by a senior assistant, teachers, and clerks and also by other personnel. Generally, the duties of the principal are as follows:

(i) To implement the entire educational program stipulated by the Ministry of Education.

(ii) To supervise and guide teachers in the schools to ensure that the teaching – learning process are properly carried out.

(iii) To monitor and supervise the education of students and matters such as discipline sports activities, welfare work and the like.

(iv) To establish good and effective public relations with parents and the public through Parents, Teachers Association (PTAs) and Board of Governor or Manager.

The standard of administration and management in some schools leaves much to be desired. This is because the principals concerned lack training and exposure in administration. Thus, they carry out their administrative duties using their own discretion and intuition. Some principals do not keep up with the latest educational management.

University of Malaya

Meanwhile, the management of co-curricular activities in the schools will be conducted by the set of teachers who are in charge of sports and other clubs. This is a normal way of running the administration in most of the schools in Malaysia.

2.6. Quality Management through Information Technology

There has been an ongoing struggle and effort to develop and establish system management in Education Ministry every year. This Quality Management System has been planned since 1992 itself. The management that has been proposed is the Staff Information System, Schools Physical Information System and the Student Information System. The Education Ministry has given priority towards four important aspects regarding the Quality Management. The four aspects are as follows:

(a) Quality information delivery

(b) Computerization of work process

(c) Information that is accurate and on time

(d) Increase rate in productivity

2.6.1. Activities

(a) Application system will be developed and established to transfer the manual workload toward computerization processes.

(b) To increase the productivity rates and make it easier to integrate information technology with the existing workload.

(c) Giving direct services to the user.

(d) To increase the infrastructure of the information technology by widening the Education Ministry's network system.

2.6.2. Development of Application System

By the end of 1995, there is at least 46-application system that was developed and organized. Other than the maintenance side, the previous system there will be another 15 more systems that will be developed. Two of it is as follows:

(i) School Financial Information System

(ii) Electronic File System

This system was implemented in all the audit branches in schools, and it is in the process of being integrated to be used even in the Education Ministry. Document will be kept in image form. It could be retrieved using computers to individuals or groups for further action. This system

University of Malaya

also made the searching of documents much easier and accessible and the problem that will be encountered will be much more less.

2.6.3. Integration of Application System

There is also steps that has been taken to integrate a few information systems that was developed separately, in a different frame of time, depending on the function in the early phase of computerization. The importance of this system integration is to establish a united information system (Sister Maklumat Bersepadu) that is uniform and has continuity among one system and another. Till the end of 1995, the Education Ministry has succeeded in integrating a few systems. A few of the system that has been integrated by the Education Ministry are such as the input of Information regarding the scholarship awards and studies loan for the undergraduate in the local varsities.

2.6.4. Direct Services

Other than that, the Education Ministry of Malaysia, have also conceptualize school administration system that consists of:

University of Malaya

(i) Staff Information System (Sister Maklumat Staf)

(ii) Student Information System (Sister Maklumat Murid)

(iii) School Physical Information System (Sister Maklumat Fizikal Sekolah)

For now the Staff Information System (SMS) has been fully developed and has already been installed in schools. Around 3000 staff from each school has been taught on how to use the system and in updating the data pool. The installation and training will still take place in the oncoming years. In the year of 1996, two more system, which was Student Information System (SMM) and School Physical Information System, was developed.

2.6.5. Importance of Student Information System

(i) It will decrease the teacher's workload, for example the registration of students.

(ii) It could be used for examination registration such as UPSR, PMR and SPM.

(iii) It will be able to detect the student's performance in studies.

2.7. Education Ministry's Guidelines on Extra-Curricular activities and Hostels Accommodation

Extra- curricular activities are very important at all school levels. Extra-curricular activities in schools are divided into three groups, namely uniformed bodies, clubs or societies and sports it is compulsory for school students to participate in at least one club or society activity and are also encouraged to take part in at least one game or sports. Out of class extra-curricular activities are important to cultivate, instill and foster esprit de-corps amongst students of the various racial origins with different background and lifestyles. It also serves to train students to be responsible, disciplined, and independent and develop skills in the activity in which they participate.

It was found that most extra-curricular activities are not carried out in small schools especially in rural areas. This is due to several factors amongst which are a lack of facilities, finance and encouragement from the school itself. On the other hand extra-curricular activities are actively carried out in the urban schools due to the favorable social and physical environment. The unfavorable situation, which prevails in small schools in the rural areas, hinders student's participation in most activities.

University of Malaya

2.7.1. Clubs and Societies

Clubs and Societies in schools can be divided into two categories, namely:

(a) Clubs and societies based on a subject aimed at enhancing the interests and skills of the students in the subject. Societies in this category include the Bahasa Malaysia Society, Science Society and others.

(b) Clubs or societies related to hobbies aimed at attracting the interest and impart knowledge on specific fields on hobbies. Societies or clubs in this category includes Photography Clubs among others.

The aim of forming a society or club in school is good as it encourage students to get to know each other, renders services to the community and also enable students to acquire skills in a particular field or hobby. In some schools little effort is made to foster a close relationship and strengthen the unity amongst the students of the various racial origins and social strata. This is clearly demonstrated by the pattern of participation where students of a particular race or social strata only join a particular society or club in school. When forming a club or society some schools do not consider the advantages that can be derived from the activities of these societies and clubs, in the context of a local

University of Malaya

environment. Consequently, the activities of the clubs or societies could not be carried out successfully.

To encourage students to be interested in the activities of the arts and language societies, schools have formed language societies. Activities commonly carried out by these societies include:

(i) elocution contest

(ii) quatrains competition

(iii) debates

In most schools, a majority of the member of such societies is from the racial group, which uses that particular language. This situation in the long term does not foster national unity amongst the students.

2.7.2. Uniform Bodies

All students are encouraged to participate in the activities of at least one uniformed body. The following are some of the organization found in schools today:

(i) Scouts and Girl Guides

(ii) Red Crescent First Aid Organization

(iii) Military and Police Cadet

University of Malaya

Of the uniformed bodies in schools, Scouts and Girl Guides activities are those with the largest membership. Almost all schools have these activities. In some schools, these activities are very active while in others; these activities are less active due to ineffective leadership. The activities of the Military and Police Cadet are beneficial and suitable for cultivating attitudes of responsibility, discipline, self-reliance and steadfullness among students.

2.7.3. Sports

Sports are compulsory in all schools. Sports activities in schools include popular games like football, badminton, netballs, hockey, rugby and basketball. Schools also organize annual athletics competition. Through the school sports council at the district, state and national levels, sports competition amongst schools all over the states are organized. Sports are an effective channel to instill the spirit of sportsmanship and to foster common understanding and unity among students. The Education Ministry has itself issued directives to schools to promote sports and encourage participation of students from all racial groups and social strata.

University of Malaya

Nevertheless, there are still instances where a particular sport is only enjoyed and participated by students of a particular race only. Sports are important for health as well as physical, spiritual and mental health development of students. Physical education in schools does not provide adequate physical bodily activities for the students. Mass drill, which can involve participation by all students, should be introduced as a practice in schools. Meanwhile, students who have talent in any area of sports can be singled out for specialized skill or training at higher level.

2.7.4. Hostels

Hostels are built with the aim of providing accommodation near the schools for students who live far away from school especially those students who are poor. With the provision of hostel facilities, students are given the opportunity to devote their attention to education without much interruption. Besides, there are indirectly able to experience life in society. In the long run, the hostel facilities help to reduce the problems of students lagging behind in education.

At present there are three types of hostels. Hostels in the daily schools are specially for accommodating students in the school whereas

University of Malaya

central hostels cater for the common needs of a number of schools while hostels in fully residential school accommodate all students in that school only. The staff managing and supervising administration of hostels in schools is the hostel teachers whereas for central and fully residential schools' hostels, the responsibilities delegated to the hostel wardens.

Apart from performing the usual functions of a teacher, hostel teachers also perform functions encompassing a number of areas such as finance, maintenance and security of building, supervision of staff and management of matters concerning hostels, such as inquiries relating to admission, discipline, security, progress in studies, as well as the physical, spiritual and social development of the hostels.

2.8. Review of Existing Systems

This system comparison is being done to compare the feasibility of the system that is being developed and the systems that has already existed. There are five systems that were dissected. Below are the systems that has been compared:

University of Malaya

2.8.1. Sister Maklumat Pelajar 99 (SMP 99)

This system was developed in trial basis for the primary school uses. This system is able to generate reports such as students' extra-curricular activities, students' profile among others. This system has a password enabler where only authorized personnel are able to access and modify the data. Sister Maklumat Pelajar was implemented in Sekolah Kebangsaan Pasir Puteh in Perak. The system is user friendly and the interfaces are very easy to understand. This system is developed using the Microsoft Access 1997 environment.

Shortcomings

It is a well-known fact that a well designed input forms should meet the objectives for effectiveness, accuracy, and ease of use, consistency, simplicity and attractiveness. All of this criteria are met for, expect the ease of use. There is a repetitive action to retrieve or generate data from the database. There will be a number of times the prompt box will be displayed. This can cause the user to get bored or tired of the process of several times of data input. Other than that this system do not reveal the whole information of a particular student. The outputs of this system are generally what the user enquired. The lacks of display of

University of Malaya

student's profile are very disappointing. The teacher's would have to access a student's overall performance this system. Other than testimonials, school leaving certificates and official letters concerning the students is generated.

2.8.2. PeopleSoft Student Administration System

This system was implemented in United States as an answer for the automation of the administration system. It is an innovative and flexible suite of software applications that will allow integrated approach to admission, financial aid, student record, and student financials and campus community. This system was implemented in order to replace its current database system. This system is quite innovative as it involves a number of records that are integrated.

Shortcomings

It obviously could be seen that there was no database allocated for the student's extra- curricular activities. There were fields included in the student's record for the extra-curricular activities, but it was very limited where there were only a small sub-topic given for this.

University of Malaya

2.8.3. Tremont Software Smwin

It uses the Standard Microsoft Windows user interfaces for ease of learning. This is one of the software that really fulfills the overall criteria for a good student administration. This system also has a good set of integration where there is only one database and a single data entry. It also has a robust security system that allows authorized users viewing the data only. There is an availability of all data in the system for query, reports, previewing and exporting.

Shortcomings.

Even though this software uses the windows user interface it does not use the Microsoft Access environment. This is important as schools here in Malaysia only have the standard Microsoft application. There will be an upheaval if software has to be installed in the computers since the teachers are not quite adept at using other software. They are then required to attend training for the usage of this system. This Tremont Software uses the Microsoft Visual C++ and Java as the software language.

University of Malaya

2.8.4. CIMS GIT Software Student Management System (SMS)

The toughest challenges are not managing all of the students, but managing all of the information associated with students. With this software, as much or information that is required or wanted to keep track of will be immediately available. All types of demographic information are stored in SMS so there is a quick access to emergency contacts, course requests, discipline records, immunization, guardian information and class schedules.

Shortcomings

There is no generation of reports out of this software. It is only limited to the viewing of the administration and there is no generation of reports. Other than that this system includes the information regarding the class schedules which is not required for the system that is being developed. The user interface is very clustered. A big number of information are stored in just one page. This decreases the level of readability.

2.8.5. RMIT University Student Management System

University of Malaya

This system is automated and easy to use. Other than that the system is also convenient and accessible to the lecturers. This system compromise of a single integrated system that will address the management needs and eliminate duplication of systems and work. The system have a high level of functionality that provides automated process management for admissions, enrollment/ re-enrollment, results management, student progress and forms processing.

Shortcomings

This system is convenient but then it still lacks a few important needs. There were no lecturer's comments for each students. This is important to keep the track of the students progress in the coming years. Other than that the system also proves to be cluttered since there are few pages dedicated only for the students admissions.

2.9. Comparison.

University of Malaya

After all the comparison that is made it could be said that among all the system there is a shortcomings for each and every system that was compared. Overall, it can be noticed that there are no complete systems that cater for the whole administration of the students. For example, the system that is compared does not have sections regarding the extra-curricular activities. Other than that most of the system is built to fulfill the needs of a university administrator and not schools administration.

2.10. Summary

This chapter consists of the literature review regarding the usage of computers in schools. This is given priority mostly to the school administration field. This chapter consists of introduction of the *Student Management System*, types of filing procedure, management at school levels, comparison with other systems, and also government's initiative to overcome this dilemma. Chapter three will be discussion regarding the system analysis and methodology that was taken to implement the development of the system.

University of Malaya

SYSTEM ANALYSIS AND METHODOLOGY

3.1. Introduction

System analysis is a systematic approach to identify problems, opportunities and objectives, and analyze the information flows in a system. The purpose of this phase is to analyze the problems while planning on the development of the project, which is to prepare an outline to solve the current problems as accepted by the user. The objectives for conducting a system analysis are:

i) to identify the school administrations needs

ii) to evaluate the *Student Management System* concept for feasibility

iii) to allocate functions to hardware, software, people, database and other system elements.

iv) to establish the time and schedule constraints for the teachers.

v) to create a system definition that forms the foundation for all subsequent works.

In this phase too, analysis is made to determine the system's requirements that include detailed information on the *Student Management System* functionality and performance. It also involves information gathering process for

University of Malaya

the particular system input, which are the school administration's requirements. Hardware and software requirements, to develop the system are determined too. A large amount of time is used during this phase to understand the requirements and study the software that will be used. The software included are Microsoft Visual Basic 6.0 and Microsoft Access 2000.

Through the analysis made, decision will be made on the development of the system. This decision will lessen the burden faced by the school administrator in student's registration. The flow of the development is determined properly as to ensure the following phases will be conducted in order. This is in order to assure the best out of the system and to complete the system within the required time frame.

3.2. System Development Strategy

The system development approach that is adapted in the development process of this project, is the "waterfall model with prototyping". The waterfall model presents a very high level view of what goes on during the development and it suggests, to developers the sequence of events that should be expected to

University of Malaya

be encountered. It can be very useful in helping developer lay out what need to be done.

Often the user interface is built and tested as a prototype, so that the users, that is school administrator's will understand what the new system will look like and the developer will get a better sense of how the users like to interact with the *Student Management System*. Prototyping is a partially developed product. In the "waterfall model with prototyping", prototype is built to enable users that are school administrator and the developer of the system to examine some aspect of the proposed *Student Management System* and to decide if it is suitable or appropriate for the final product.

This approach has been chosen in the project because it lay out the tasks that need to be done and also the sequence of events. **Figure 3.1** represents the "waterfall model with prototyping" and indicates that each development stage should be completed before the next stage begins. Prototyping is used to examine some aspect of the proposed system and to decide if it is suitable for the final system. In this project, the prototype will be built for the user interface, for data entry as well as the rules for satisfactory modules.

University of Malaya

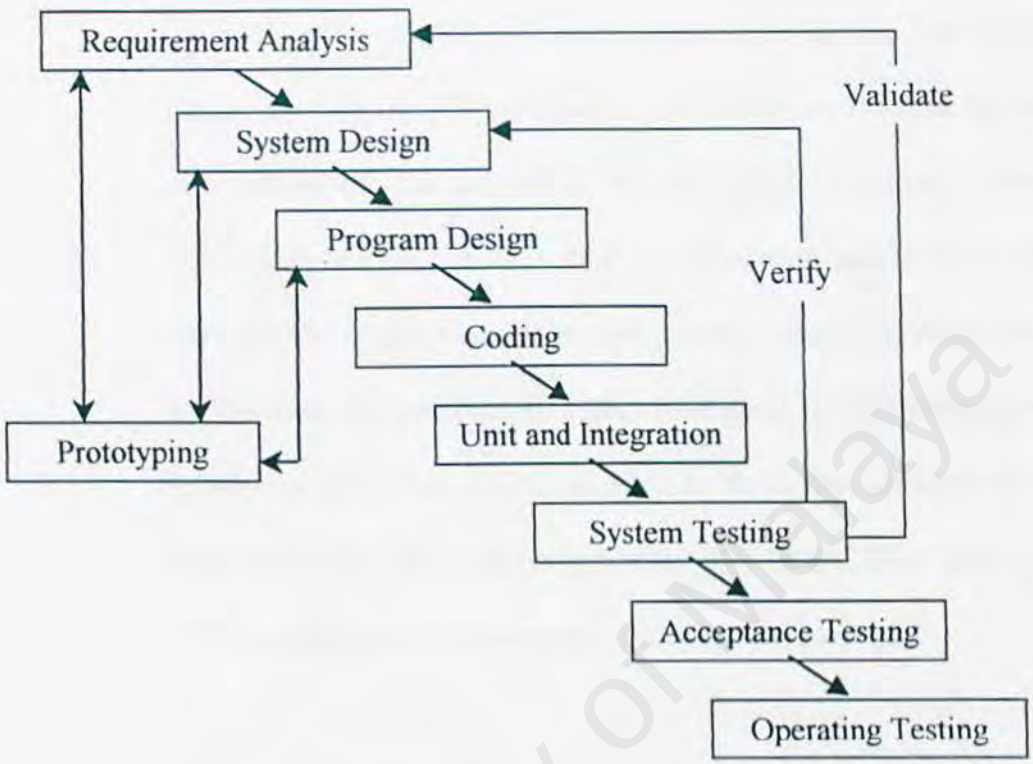

Figure 3.1. Waterfall Model with Prototyping

3.3. Information Gathering Technique

This process of information gathering is carried out in order to better understand the *Student Management System* and user's requirement. Among few of the suitable methods used during this process are:

i) Interview

An information-gathering interview is a directed conversation with a specific purpose that uses a question and answer format. The respondent, who is also the user of the systems, was interviewed to get the required information on the system to be developed. Adequate information provided by the user or the system's requirements and existing problems will ease the development of the new system, which will be built to fulfill the requirements mentioned while eliminating those existing problems. Interviews have been conducted with a few of the ex-teachers who are now continuing their studies at University Malaya. They gave a clearer view regarding the administration system in the schools.

ii) Books

Books were widely used as a mean in obtaining information regarding this system. Books provided related issues related to the topic. Information is able to be gathered using this method. Reference books regarding information system, journals and yearly report of the Education's Ministry is used. The guideline is based on the information that was gathered from all of this books.

iii) Discussions

University of Malaya

Discussions are made regularly with supervisor, especially when problem arises and certain clarifications are needed. Discussions are also conducted with other lecturers and friends on certain matters related for better understanding and improvements in *Student Management System*.

iv) Observation

Observing the user and user's physical environment are also important information gathering technique. The user here refers to the persons who are involved in the school administration. Through observing activities of users, one can seek to gain insight about what is actually done, not just what is documented or explained. With this observation too, one will be able to understand more about the related activities and functions of the school administrations and so as to cater and meet the needs of the user in the systems to be developed.

v) Internet Surfing

Internet is the largest information warehouse in the world. As such, it is used to get information that is applicable worldwide. The information regarding the comparison of the existing system is obtained through Internet surfing.

University of Malaya

3.4. Feasibility Study

With all the data and requirements that is collected from the information gathering processes a feasibility study was conducted to formulate and understand on how the users will use the *Student Management System* in order to construct a frame work in which the *Student Management System* is based on. Feasibility study means that the proposed project can help the organization attain overall objectives and is possible to accomplish with the present organization, resources in the following three areas:

1) Technical
2) Economic
3) Operational

Ascertaining the overall feasibility of this project means finding out the *Students Management System* practices and objectives, and then determining if the project to be developed will serve to their requirements and move the business towards its objectives in some way. It also involves consideration on aspects like naming the system, scope and concept of the system, hardware and software specification and anticipated problems.

University of Malaya

From the interview conducted, the main objective of developing this system is to manage the data and information of the students mentioned, and to assist the school administration in their daily work. With a few main features like user friendly interface and a computerized database, *Student Management System* will be able to serve these objectives. Data and information can be retrieved and manipulated easily and implemented together with reports generation.

3.5. System and User's Requirements

After determining that the system is feasible, the system's requirements need to be drawn out to provide a guideline when developing a particular system. A requirement is a feature of the system or a description of something that is tangible. The system is capable of accomplishing and to fulfill the system's purposes. There are two types of requirements that are:

(i) Functional Requirement

(ii) Non functional Requirement

3.5.1. Functional Requirement

University of Malaya

A functional requirement describes an interaction between the system and its environment. It also describes how the system should behave given a certain stimuli. The functional requirements of this system are listed below:

i) Electronic Database

All data and information needed are kept in the database, where they can be stored, retrieved and manipulated easily at any time. It is very convenient for the school administrator to keep track of the students.

ii) Manage and produce information required

The system is able to manage vast information based in an orderly manner to enable easy access to information and when the need arises from the management. For example, the registration for the students would be easy. Other than that, the allocation for sports house for the students should be balanced by sex and also the races of the students.

iii) Report and testimonial generation

Data and information kept in the database could be viewed in two-dimensional way for a better understanding and presentation comparison can be made through those and it is very useful in

University of Malaya

helping the user making appropriate decision. The report are timely summarized and generated when required by the school administrator for a better understanding and presentation.

iv) Queries facilities

Application would provide answers to queries made by the user in a fast and effective manner, based on the criteria given and information needed.

3.5.2. Non-functional Requirements

A non-functional requirements or constraint describes a restriction on the system that limits choices for constructing a solution to the system. These constraints usually narrow the selection of language, platform or implementation techniques. However the selection is made at the design stage, after the requirements have been specified. The non-functional requirements of the system are listed as follows:

i) Easy to use

Complete user guides and documentation would be provided, as to ensure that users should be able to handle and operate the system by themselves. Help functions are also provided

University of Malaya

throughout the system in order to guide users when they encounter any problems.

ii) Graphical and friendly user interfaces.

GUI's are to be implemented throughout the system to provide a very user-friendly interface and in assuring ease of use to the user. GUIs eliminate the need of keeping in commands and even can be operated by non-technical staffs. Hence GUI enables users with no or little technical background to be able to operate the system well and to use it to the maximum.

iii) Security

The application would only allow authorized users with the correct login and password to access and manipulate the data kept in the database. An effective error handling procedures will also help the user from terminating the application immaturely.

iv) Reliability

This system should be reliable which means that it does not produce dangerous or costly failures when it is used in a reasonable manner that is in a manner that typical users expect.

University of Malaya

v) Robustness

This system should be robust. Robustness refers to the quality that causes a system to be able to handle or at least avoid disaster in the face of unexpected circumstances such as when given improper data.

vi) Efficiency and effective

In computer terminology, efficiency means a procedure that can be called or accessed in unlimited number of times to produce similar outcomes or output at a creditable pace or speed. Effectiveness means that the input and output screens serve specific purpose in the system.

vii) Maintainability

A system is maintainable if the programs are easily understood by the maintenance programmer and are easy to modify and to test when updating to meet new requirements, rectifying a deficiency, correcting errors or moving to a different computer systems.

viii) Simplicity and Attractiveness

This refers to keeping forms and screen properly uncluttered in a manner that focuses the user's attention. Attractiveness refer to

University of Malaya

the user's enjoyment or attraction to use the system due to their appealing design.

3.5.3. User Requirements

The overall requirements by the user are summarized as follows:

i) Data stored in database can be of any period specified by the user, such as student's record generation in monthly, yearly or daily basis.

ii) Category or module created in the application will be able to retrieve and manipulated the contents of related data in the database, beside being able to add new records and delete existing records in the database.

iii) Application developer will be able to generate related table for viewing, according to the criteria specified by the user.

iv) User will be able to key in necessary and related notes on each category or module created in the application.

v) Appropriate proportion on values retrieved can be viewed directly and will be updated automatically on any changes made to the data.

University of Malaya

3.5.4. Hardware and Software Requirements

The choice of hardware and software used in developing a system is very important as it has a profound impact on the cost, quality and productivity of the system:

Hardware:

Given below are the specifications of the hardware that is required for the implementation of this system.

- Processor: Pentium 166 or above
- Operating System: Windows 98 environment
- Memory: 32 MB or above
- Hard disk: 800 MB or above
- Keyboard and mouse as input device
- VGA monitor

Software:

Given below are the specifications of the hardware that is required for the implementation of this system.

- Microsoft Visual Basic 6.0 as a user interface

University of Malaya

- Microsoft Access 2000 as a database

The Microsoft products have been chosen because the software is easily available. Microsoft Access 2000 is used as the back-end application to serve as database management and is chosen because it provides relational database power to manipulate information. Other than that, Microsoft Access is most likely to be available in all of the computers in the schools, as it will be preloaded before hand by the administrator. The teachers and staff in the schools are quite adept in using Microsoft Access application compared to other complicated software. This can be said so since it is a very easy to use and navigate the software. This system is not created for mainframe but was created specially for PC's so that, it will have commercial value and could be used widely. Microsoft Access 2000 support SQL statement and it can be easily integrated with the programming language being used to write source code.

Microsoft Visual Basic 6.0 is used as the front-end application to develop the user interface. It is chosen because it provides all the utility needed to create a good interface and more over it is an easy to learn programming language with graphical user interface. Other than that it is

University of Malaya

integrated with most of the Microsoft tools, including Microsoft Access 2000 which is integrated through Open Database Connectivity (ODBC).

3.6. Microsoft Visual Basic 6.0

Microsoft Visual Basic 6.0 programming language is excellent to be implemented as Windows based application, where it provides an environment for fast and easy development of applications through the use of Graphical User Interface (GUI). It is an event driven language and supports some object-oriented programming. An application developer with an event driven model is more interactive compared to procedural language and responds to events that happen in the computer environments, such as clicking a mouse button. With Microsoft Visual Basic, class modules (all object-oriented concepts) can be written and reused or distributed.

Besides that, there are many other OCX and Active X controls that can be implemented according to the needs of the program being designed. A set of toolbar is prepared in Visual Basic to assist in the application development, where each component in it provides certain functionality. Microsoft Visual Basic also provides a huge library of references. The most often used reference is

University of Malaya

the "Microsoft DAO Library". This library provides methods to manipulate the database. With the DAO (Data Access Library), tables and databases could be created dynamically for any point of execution. The database will be in the Microsoft Access format. The available libraries and Active X controls in the Visual Basic enable systems, developers to manipulate the program written in minimum coding and frustrations.

Microsoft Visual basic is one of the most popular programming tools in Windows environment, due to its RAD (Rapid Application Development) capability associated with it. It also includes a package and development wizard that will determine all the required dependency files that must be distributed with the project. This wizard will be used to create setup disk(s) for installing the application in any platform recommended thus making the installation process of the viewing created program easier.

3.7. Summary

This chapter provides an insight into the systems methodology, the steps that are taken to ensure a complete completion of the system. Other than that the information gathering technique are also discussed. The system requirements, the software that is being used is among other things that are also discussed. Chapter

University of Malaya

4 will be discussing about the system design phase of the *Student Management System.*

University of Malaya

SYSTEM DESIGN

4.1. Introduction

Design is the first step in the development phase, in which requirement are translated into a representation of the software that can be accessed for quality before code generation begins. This is a very important phase in the development process, where the designs will determine operationality and performance of a system built.

The design process is better known as physical design referes to the evaluation of alternative solutions. Subsequent refinements lead to a decision representation that is very close to the much lower levels of abstraction. Initially, it establishes an overall system architecture of the system to be developed.

To achieve a good design and software quality, three characteristics that serve as a guide for the evaluation are suggested.

(i) The design must implement all the explicit requirements contained in the analysis made and it must accomaodate all the implicit requirements desired.

(ii) The design must be readable, understandable guide for those who generate code and for those, who test and subsequently maintain the system.

University of Malaya

(iii) The design should provide a complete picture of the system, addressing the data, functional and behavioral domains from an implementation perspective.

4.2. Architectual Design

The primary objective of architectual design is to develop a modular program structure and represent the relationship that is developed between modules. Architecture associates the system capabilities identified in the requirement specification with the system components that will be implemented. In addition, the architecture defines operations that create systems from sub-system.

4.2.1. Functional Model

Figure 4.1 shows the functional model of the Student Management System application. The two main menu or functions used in this application are ***module*** and ***system***.

(i) ***Module***

This menu or function consists of, separate modules which are used by the administrator of the school in Student Management System. Each module represents its own category in which the

University of Malaya

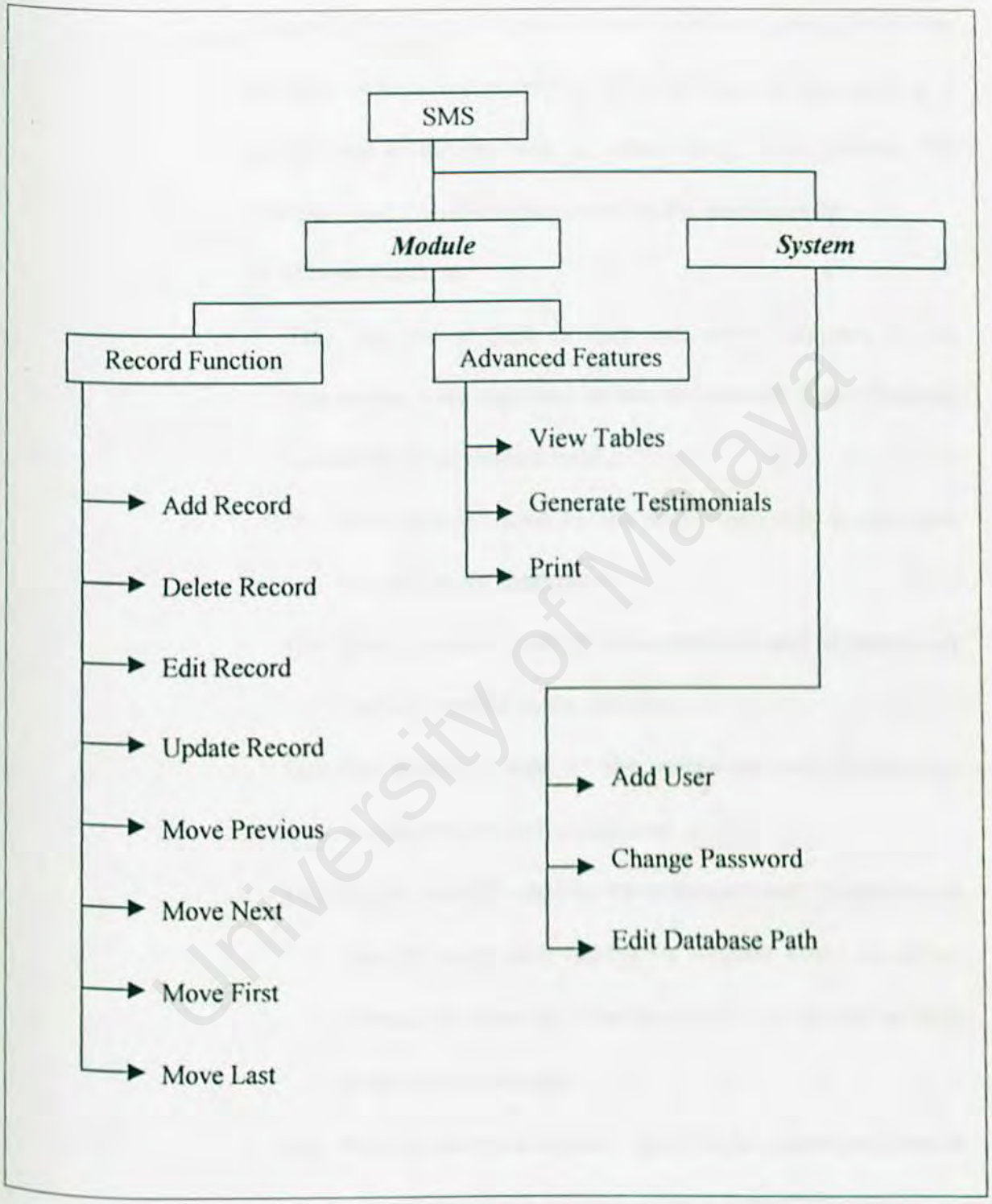

Figure 4.1: SMS Applications

University of Malaya

data and information are grouped and kept. Although all modules are built in separate interfaces, the interfaces are designed in a simple and consistent way of representing data. Among the common functionality implemented in the interfaces are:

a) Record Function

This function is built in each and every interface in the application to manage and browse the records in the database according to the module used.

(i) Add record – used by the authorized user to add new records in the database.

(ii) Delete record – used by the authorized user to delete any existing records in the database.

(iii) Edit record – used by the authorized user to edit any existing record in the database.

(iv) Update record – used by the authorized user to update any changes made after editing the records. Users can chose Cancel, to cancel any changes made to the record withput updating the database.

(v) Move to previous record – used by the authorized user to view the previous record available in the database.

(vi) Move to next record – used by the authorized user to view the next available record in the database.

University of Malaya

(vii) Move to the last record – used by the authorized user to view the last record available in the database.

(viii) Move to the first record – used by the authorized user to view the first record available in the database.

b) Advanced Features

These features are used to help the management to have a clearer view of the available data in the database and to help them making better decision and judgement. Among the features that can be found are listed below:

(i) View Table – used to view the data in a tabular format

(ii) Generate testimonial – used to generate testimonials for the students based on the available data in the database.

(iii) Print – Used to prints contents in any modules.

(ii) *System*

Their menu or functions consist of three main functions, used by the user to manipulate or make changes to the system or application. Only authorized user who has the permission with a valid logging ID into the system, will be able to use those functions.

University of Malaya

(i) Add user – used by the authorized user to add a new user account for the application.

(ii) Change Password – used by the user to change their existing or current password to log in the system.

(iii) Edit database path – used to change path to refer to the database used in this application.

Note : Authorized user in this context refer to the user who has valid accounts created in the application. In this case the authorized user would be the teachers in the schools. Authorized user will have the full authority to use any of the functions created in the application, including those that will affect the databvase and system used.

4.3. Database Design

Database design focuses on the design of the database model that will support the system operations and objectives. In the process of database design, concentration is given on the data characteristics required to build the database model. The major aims of a databse design are:

(i) to represent the data and the relationships between data required by all major application areas and user group.

University of Malaya

(ii) to provide a data model that supports any transactions required on the data.

(iii) To specify a design that will achieve the stated performance requirements for the system such as the response time.

4.3.1. Table Structures in the Database.

There are three tables invlved in the Student Management System database. These tables are listed below:

(i) Academic and Hobby Club

(ii) Uniform Bodies

(iii) Sports

Field Name	Data Type	Field Size	Description
Student ID	Auto Number	Long Integer	Student's registration number
Name	Text	80	Student's Name
Year	Number	Long Integer	Year of study
Enrollment Date	Date / Time	Medium Date	Enrollment date in Clubs
Category	Text	60	Either Academy or Hobby Club
Academic	Text	50	The name of the clubs
Hobby	Text	50	The name of the clubs
Position	Text	50	Position held in the clubs

University of Malaya

Attendance	Number	Long Integer	Attendance record for gathering
Achievement	Text	50	Major achievements in clubs
Comment	Text	200	Comments from the clubs advisor

Table 4.1: Academic and Hobby Club

Field Name	**Data Type**	**Field Size**	**Description**
Student ID	Auto Number	Long Integer	Student's registration number
Name	Text	80	Student's Name
Year	Number	Long Integer	Year of study
Enrollment Date	Date / Time	Medium Date	Enrollment date in bodies
Category	Text	80	The type of Uniform Bodies
Teacher	Text	60	Teachers in charge of the bodies
Rank	Text	50	Rank in the uniform bodies
Attendance	Number	Long Integer	Attendance record for gathering
Achievement	Text	100	Major achievements in bodies
Comment	Text	200	Comments from the advisor

Table 4.2: Uniform Bodies

University of Malaya

Field Name	Data Type	Field Size	Description
Student ID	Auto Number	Long Integer	Student's registration number
Name	Text	80	Student's Name
Year	Number	Long Integer	Year of study
Enrollment Date	Date / Time	Medium Date	Enrollment date in activities
House	Text	25	The sports house allocated
Category	Text	50	The types of sports
Teacher	Text	60	Sports activities advisor
Position	Text	50	Position held in sports house
Attendance	Number	Long Integer	Major achievements in bodies
Achievement	Text	100	Record for gathering
Comment	Text	200	Comments from the advisor

Table 4.3: Sports Activities

Field Name	Data Type	Field Size	Description
Student ID	Auto Number	Long Integer	Student's registration number
Name	Text	80	Student's Name
Year	Number	Long Integer	Year of study
Room No.	Number	Long Integer	Student's Room Number

University of Malaya

Warden	Text	60	Warden's name
Address	Text	150	Student's Address
Emergency No.	Number	Long Integer	Students House Number
Teacher	Text	60	Class teacher's name
Fees	Text	25	The fees that should be paid
Medical Record	Text	25	Student's medical records
Food	Text	25	Supplement of foods
Enrollment Date	Date / Time	Medium Date	Date of enrollment in hostel

Table 4.4: Hostel Accomodation

4.3.2. Structural Chart

This chart depicts all the requirements that is needed in the development of the system. This is very important as it will enable the user's to undersatnd how the system will cater for the needs of the users. Other than that it will also enable the user to view in clear perspective of what the system is offering to the users. Given is the structural chart for:

- Overall system

University of Malaya

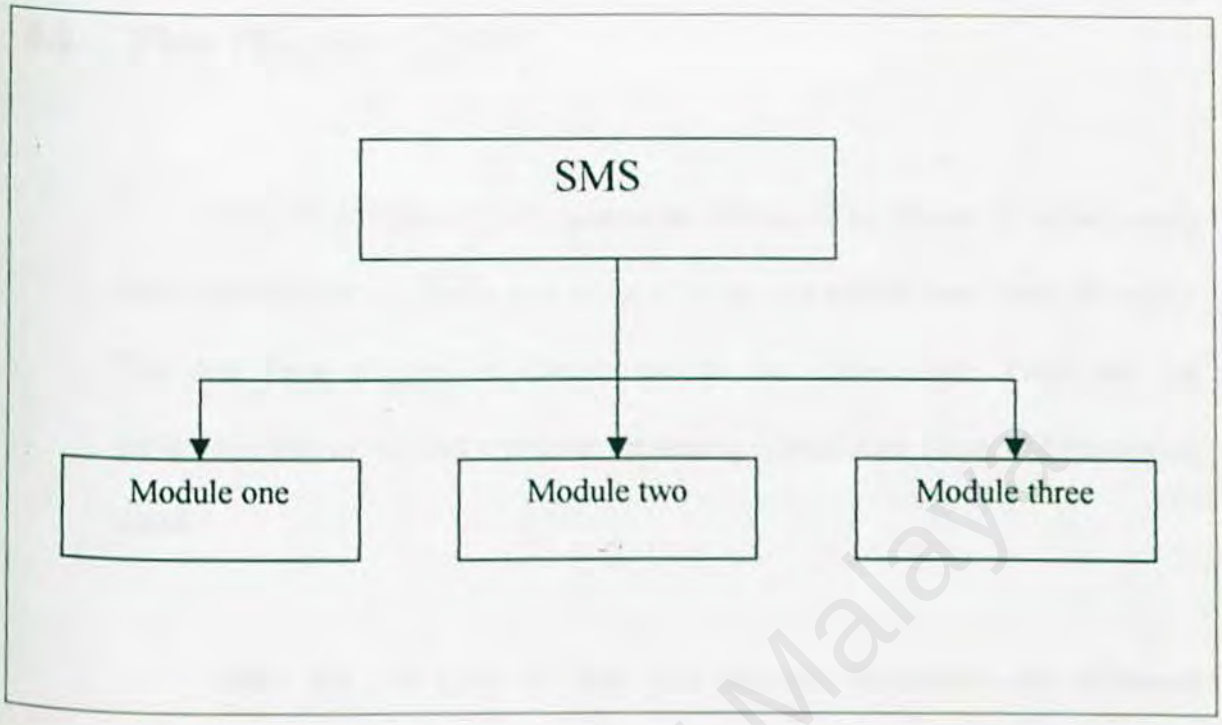

Figure 4.2: Overall System

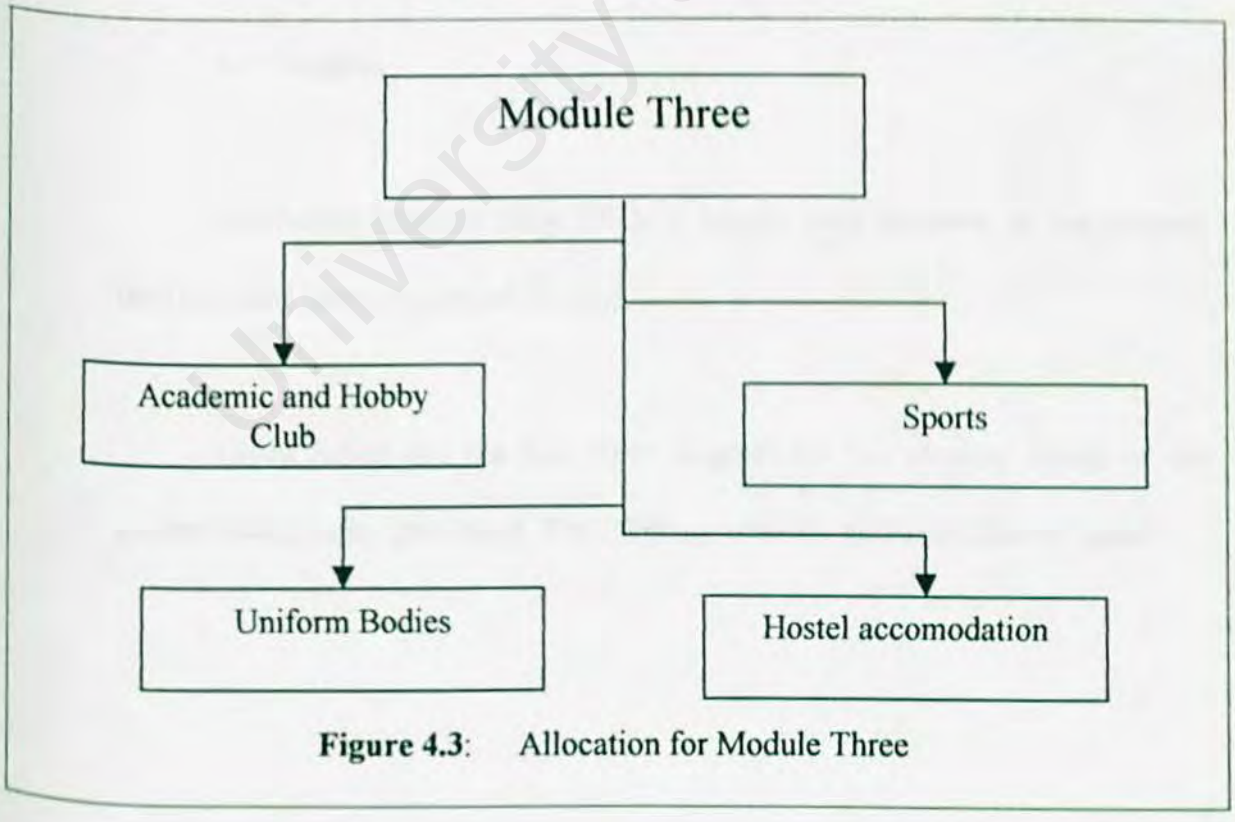

Figure 4.3: Allocation for Module Three

University of Malaya

4.4. Flow Diagram (DFD)

Data flow diagram is a graphical technique to depict the information flows and transforms actions that are applied as data moves from input to output. The data flow diagram is also known as data flow graph. DFD may be partitioned into levels that represent increasing information flows and functional detail.

There are two types of data flow analysis developed and promoted simultaneously by two organizations namely:

- Gane and Sarson
- Yourdon

Difference between these DFDs is mainly their symbols. In this project, the Gane and Sarson approach is used.

Given below are the data flow diagram for the security aspect of the system that is being developed. The DFD are used for authentication of users.

University of Malaya

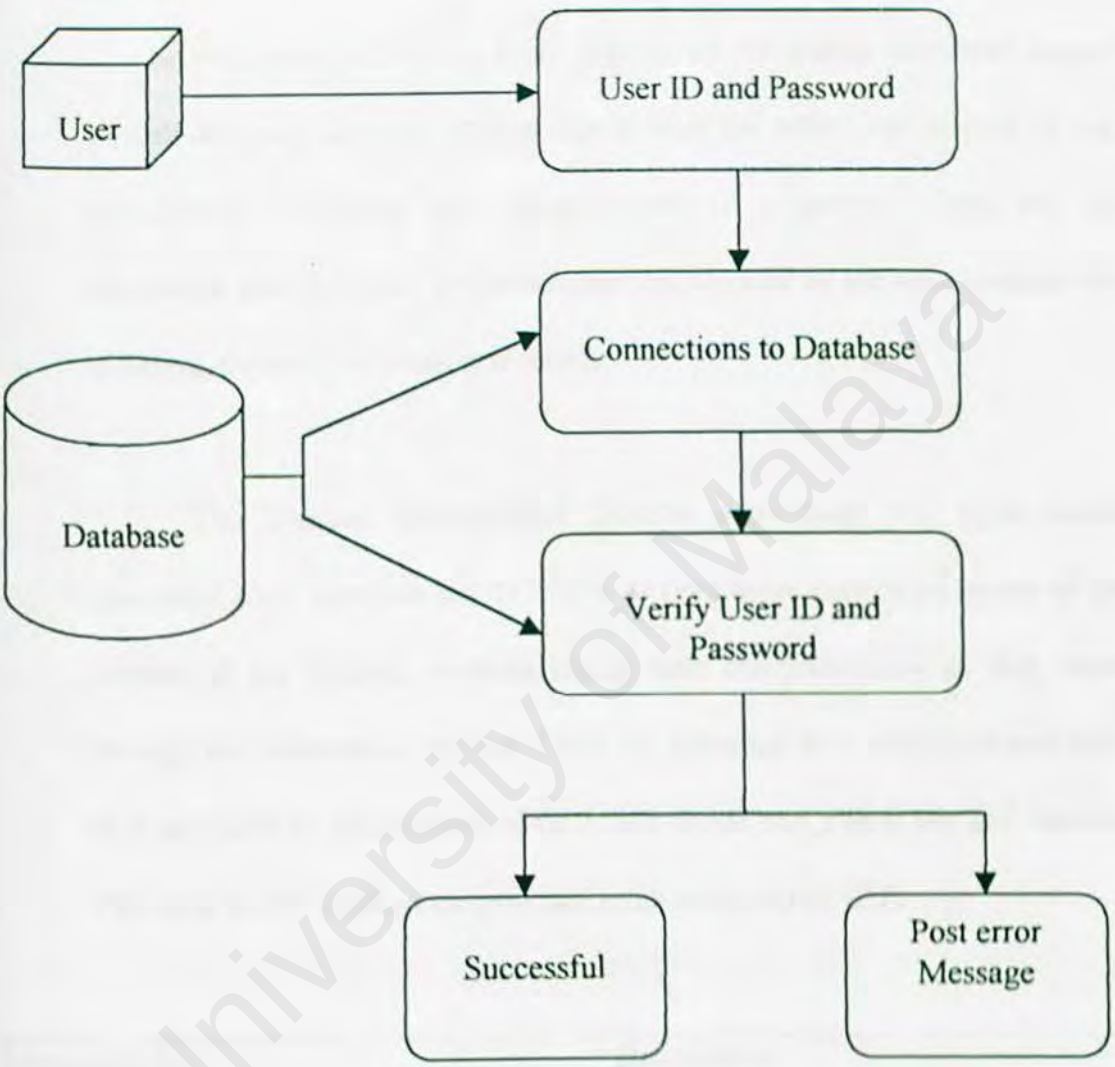

Figure 4.4: Authentication for user

University of Malaya

4.5. Interface Design

The quality of system input determines the quality of system output. A well-designed interface screen should meet the objectives of ease of use, consistency, simplicity and attractiveness of a system. These are the objectives attained from understanding the respond of the user towards the different elements of forms and screen.

The Student Management System application will incorporates Graphical User Interface (GUI) screen to help users gain rapid access to the content of the systems, without losing their comprehension as they move through the information needed. These are accomplished with keyboard input or a use clicks to components of GUI such as list box, check box and buttons. The table below displays on principal characteristics of GUI.

Characteristics	Description
Windows	Multiple windows allow different information to be displayed simultaneously on the user's screen
Icons	Icons represent types of information, on some systems, icons represent files on others, and icons represent processes.
Menus	Commands are selected from a menu rather than typed in a

University of Malaya

	common language.
Pointing	A pointing devices such as mouse used for selecting choices from a menu or indicating items of interest in a window
Graphics	Graphical elements can be mixed with the text on the same display

Table 4.5: Principal Characteristics OF GUI

The advantages of using GUI's in any application are listed below:

(i) They are relatively easy to learn and use. User with no computing experience can learn to use the interface after a brief training session.

(ii) The user has a multiple screens (windows) for system interaction. Switching from one task to another is possible without losing sight of information generated during the first task.

(iii) Fast full screen interaction is possible with immediate access to anywhere on the screen.

A direct manipulation interface implemented in GUI's present user with a model of their information space. They can interact with this information through direct actions such as replacing information, moving information and so on. The advantages of direct manipulation interfaces are listed below:

(i) User's learning time is relatively short.

University of Malaya

(ii) User's feel in control of the computer and are not intimidated by it.

(iii) Users get immediate responses on their actions. Mistakes can often be detected and corrected quickly.

The user interface screen in Student Management System is designed with considerations of the needs, experience and capabilities of the system user. Refer toTable 4.6 below. Users of the system are continuously involved in the design process, where prototypes created in the interface development are made available to users. The resulting feedback from the users is then used to improve the user interface design.

Principle	Description
User Familiarity	The interface should use terms and concepts, which are drawn from the experience of the anticipated class of user.
Consistency	The interface should be consisted in that comparable operations should be activated in the same way.
Minimal Surprise	Users should never be surprised by the behavioral of a system
Recoverability	The interface should include mechanism to allow users to recover from their errors.
User Guidance	The interface should incorporate some form of context – sensitive user guidance and assistance

Table 4.6: Principals of User Interface Designs

University of Malaya

4.6. Output Design

Output is the information delivered to users through the Information System. Some data require extensive processing before they become a suitable output. In order to design a useful output for the application, several objectives are to be attained through the output designed:

(i) Output designed is to serve the intended purpose

(ii) Output designed is able to suit the user requirement.

(iii) Output delivered is to be in appropriate quantity desired.

(iv) Output produced is to be provided at the right time and format

(v) Appropriate output method is to be chosen for delivery.

4.7. Help System Design

Learning anything new is a challenge. Although the challenges is usually joyous and satisfying, when it comes to learning about computer systems many people experience anxiety frustration and disappointment. Most of the users for this application have no or very little knowledge on a computerized system, and learning this would definitely be a tedious job for the users.

University of Malaya

Therefore, the Student Management System application offers a comprehensive structured help system, which teaches the users through a step by step guide on the operations of the system. Every module in the application is designed with built in user guidance related to the module to give adequate help and advice to the user. A keyword or index search is also provided to let user look for certain related help topics in this application. The contents of each help topic are written to provide a simple description on the topic-related without overwhelming the user with information.

If errors should occur during the use of a program, an error message will prompt the users of the problem and teach them how to correct the related problem.

4.8. Expectation of System

This system in general requires the retrieval, analysis and reporting of student's records. This system is applicable to every student that has been formally enrolled in schools. This student's registration numbers and every record that usually will be filed manually by the teachers will be recorded on a database that will be created. This system also enables the teachers to tap into the

University of Malaya

students information systems without the hassle of going through the particular student's manually written records.

4.9. Summary

The system design is a very important phase in the development of the project. The overall picture of the design is being discussed in this chapter. It covers the architectural design, database design, structural chart, data flow diagram, user interfaces, output design, and the help system that is required. Chapter 5 will be discussing the implementation phase of the system design. In Chapter 5 the coding approach and debugging technique will also be discussed.

University of Malaya

SYSTEM IMPLEMENTATION

5.1. Introduction

System implementation involves the translation of the software representation produced by the design process into a computer readable form. In other words, system implementation is a process that converts the system requirement and designs into program codes. This phase at times involves some modifications to the previous design.

Implementation process is conducted based on the system design prepared in the design phase, to ensure that the system developed meets the requirements specified and in line with the scope and concept of the system determined. The major works that was done in this process include coding and debugging which are needed to solve the problems and errors during the coding stage. Coding step in the implementation phase involves translating a detailed design representation of software, into a program language realization.

University of Malaya

5.2. Development Environment

In this stage of implementation, the development environment such as software and hardware requirement, which have been determined in the system analysis will be used to implement *Student Management System*.

Software	Module	Description
Windows 98	Operating System	Used as a default operating system
Microsoft Access 2000	Database	Build a relational database to store and manipulate data.
Visual Basic 6.0	System Development	Coding on system function and coding on the system interface

Table 5.1. Development Tools

University of Malaya

5.3. Microsoft Access 2000

The Microsoft products have been chosen because the softwares are easily available. Microsoft Access 2000 is used as the back-end application to serve as database management and is chosen because it provides relational database power to manipulate information. Other than that, Microsoft Access is most likely to be available in all of the computers in the schools, as the administrator will preload it before hand Microsoft Access 2000 support SQL statement and it can be easily integrated with the programming language being used to write source code.

5.4. Visual Basic 6

Microsoft Visual Basic is the fastest and easiest way to encode applications for Microsoft Windows. Visual basic provides a complete set of tools to simplify rapid application development.

Rather than writing numerous lines of code to describe the appearance and location of interface elements, simply add the pre-built object into place on screen. This is the method used to create Graphical User Interface (GUI). Visual

University of Malaya

Basic is an event driven programming language. Event driven programming is a process of writing programs that respond to triggered events, as opposed to older text based programs that were sequential in nature and follows a predetermined flow.

In an event driven programming environment, each user interaction - such as a mouse click or a keystroke – is known as an event. An event driven programming would responds to movements of a mouse and clicks and should respond differently depending on where the mouse is located. These program provides almost immediate feedback to the user and allow the user great control over the activity of the program.

The following explains the advantages of using Visual Basic 6:

(1) Easier way to create Windows application

Visual basic is a visual program language, which enables the developer to rapidly create a Window based application. Although it is not a pure Object Oriented Programming (OOP) language, it lead itself to the OOP concept by offering a set of predefined objects such as command button, text button, option boxes, list boxes, etc. that each be added to a program by dragging them there. Therefore, the time taken to pick up this language is shorter.

University of Malaya

(2) Easier to learn

The code written in Visual Basic is easy to read, to write and easy to understand. The structure is understandable with its command constituted by simple English.

(3) Support Database connectivity

Visual Basic application can be used to access the database that is built in the Microsoft Access. SQL (Structured Query Language) functions in Visual Basic applications will act as a front-end tool for the user to retrieve and manipulate the contents of the database.

(4) Integrated Debugger

Visual Basic programming environment provides an integrated debugger. Debugging program is crucial process to remove bugs from the program. Visual Basic debugger functions are single or procedure stepping setting breakpoint and adding watch window.

(5) Error Handling Function.

Error handling in Visual Basic can be implemented efficiently. Error handling is used to respond to unexpected event in the program.

University of Malaya

5.4.1. List of Controls Used

Student Management System used a number of controls in the Visual Basic to perform the difference operation. The table below shows the controls that has been used in the *Student Management System*:

Control	Description
Text Box	Used to accept and display information entering
Label	Used to display control used to display text
Command Button	Used to begin, end or for interruption process
Combo Box	Used to list the information retrieved from the database.
Masked Edit	Used to ensure restricted data input.
Image	Used to display graphic

Table 5.2. Controls Used

University of Malaya

5.5. Coding Methodology

Coding methodology used for the *Student Management System* development involved the top-down approach. Top-down approach which is also known as divide and conquer, allows the high level module to be coded first and leaving the lower level modules called skeleton forms, to be filled later.

The lower modules are only a shell, with an entry and an exit, in other words as the higher modules are being coded, references are made to lower modules as if they are coded and available. But in fact a call to that still incomplete module will result in an empty action. One of the advantages of this approach is that it ensures the most important modules of *Student Management System* will be developed and tested first to meet the deadline. It also gives a preliminary version of the system sooner.

5.5.1. Coding Principles

The following principles were applied during the implementation of *Student Management System*.

University of Malaya

Coding Convention

Coding convention such as program labeling, naming convention, comments and indentations should be adhered to.

Readability

Codes should be easy to understand. Adherence to coding convention such as naming convention and indentation contribute to program readability.

Maintainability

Codes should be easily revised or corrected. To facilitate maintenance, code should be readable, modular and as general as possible.

Robustness

The codes should be able to handle cases of user errors by responding appropriately.

University of Malaya

5.6. Structure Programming

Structure programming is a disciplined approach to programming that results in programs that are easy to read and understand and less likely to contain

errors. The emphasis is on following accepted program style guidelines to write codes that are clear and readable. Obscure tricks and programming shortcuts are strongly discouraged. The main advantage of structure programming is that it is easier to design in the beginning and easier to maintain over the long term.

An easy to read source makes the system easier to be maintained and enhanced. The elements of style include internal (source code level) documentation, methods for data declaration and approach to statement construction. The following lists some of the style used during the coding stage: -

- Selection of meaningful identifier (variable and labels) names
- Description and appropriate comments written in the source code
- Indentation of codes increases the readability of source codes

For *Student Management System* sub-routine has been added for the procedure. The sub-routines that have been added are updateButtons, navigateButtons and lockTheControls. This new sub-routine has been added since it is necessary to create control array for the command button. This control array is important since the entire command button will be held together by this set of array. The control array has been used only for five modules, that is academic club, hobby club, uniform unit, sports and hostel accommodations.

University of Malaya

The command button that has been used for the *Student Management System* is Move First, Move Previous, Move Next, Move Last, Tambah, Kemaskini, Simpan, Padam, Undo and Batal. Below is an example of the sub-routine that has been created for the control array: -

```
Public Sub updateButtons(Optional bLockEm As Variant)
Select Case Data1.Recordset.EditMode
Case dbEditNone
  If (lTotalRecords > 1) Then
    If (Data1.Recordset.BOF) Or _
     (Data1.Recordset.AbsolutePosition = 0) Then
      navigateButtons ("0011110101")
    ElseIf (Data1.Recordset.EOF) Or _
     (Data1.Recordset.AbsolutePosition = lTotalRecords - 1) Then
      navigateButtons ("1100110101")
    Else
      navigateButtons ("1111110101")
    End If

  ElseIf (lTotalRecords > 0) Then
    navigateButtons ("0000110101")
  Else
    navigateButtons ("0000100001")
  End If
```

University of Malaya

```
        If (Not IsMissing(bLockEm)) Then
          lockTheControls (bLockEm)
        End If

      Case dbEditInProgress
        Call lockTheControls(False)
        Text1.SetFocus
        navigateButtons ("0000001010")

      Case dbEditAdd
        Call lockTheControls(False)
        navigateButtons ("0000001010")
        Text1.SetFocus

      End Select
End Sub

      Public Sub navigateButtons(sButtonString As String)
      Dim iIndx As Integer
      Dim iButtonLength As Integer

      sButtonString = Trim$(sButtonString)
      iButtonLength = Len(sButtonString)

      For iIndx = 1 To iButtonLength
        If (Mid$(sButtonString, iIndx, 1) = "1") Then
```

University of Malaya

```
        cmdButton(iIndx - 1).Enabled = True
    Else
        cmdButton(iIndx - 1).Enabled = False
    End If

Next

DoEvents

End Sub


Public Sub lockTheControls(bLocked As Boolean)
Dim iIndx As Integer

With Screen.ActiveForm
For iIndx = 0 To .Controls.Count - 1
  If (.Controls(iIndx).Tag = "1") Then
    If (TypeOf .Controls(iIndx) Is TextBox) Then
      If (bLocked) Then
        .Controls(iIndx).Locked = True
        .Controls(iIndx).BackColor = vbWhite
      Else
        .Controls(iIndx).Locked = False
        .Controls(iIndx).BackColor = vbWhite
      End If
```

University of Malaya

```
            End If
        End If
    Next

    End With

End Sub
```

5.7. Debugging Technique

Debugging is not testing but always occurs as a consequence of testing. The debugging process will always have one of two outcomes: (1) the cause will be found and corrected, or (2) the cause will not be found. In the latter case, the person performing debugging may suspect a cause, design a test case to help validate that suspicion, and work toward error correction in an iterative fashion.

Actually, debugging tool is crucial for a developer during the development stage because it is really difficult for developer to write error-free software. That is not to say it is impossible to write perfect software. It is just very hard and takes a lot of effort, practice, diligence and lots of experience.

University of Malaya

Most of the popular programming languages are supported by a rich set of development tools.

5.8. Summary

System implementation is the phase where all the logical design of Chapter 4 (System Design) would be reviewed and implemented to create a complete set of *Student Management System*. For this chapter the discussion is centered mainly on the implementation phase.

The development tools that was used such as Microsoft Access 2000 and Visual basic 6 has been discussed. The coding approach that has been used is top down approach or also known as divide and conquer approach. Mainly, it could be said that this chapter is generally about the coding stage of the *Student Management System.*

Overall it could be said that a lot of problem has arises during the system implementation phase, mainly the time constraint, But most of the problems had been overcome. The next chapter will be a discussion regarding the testing phase of the Student Management System.

University of Malaya

TESTING

6.1. Introduction

Testing is an important phase in the project after the initial completion of the development phase. This is the phase where after the system has been completed; a need arises to test the system that has been developed. It is a well-known fact that there is no foolproof way to have a complete set of system without encountering any problems in the implementation phase.

No matter how capable we are in writing programs, it is very clear from the variety of possible faults that components of the program should be checked and tested to ensure the components as well as the programs as a whole are coded correctly. It is possible, even if the mistake is a small one, that the system would not function accordingly to what that has been designed to do. Due to the errors that has been done during the system development or during the system design phase, faults and failures may happen, even when the entire system has been developed and produced. These are the kind of errors that should be avoided.

University of Malaya

The corrective measures that could be taken to prevent this are to implement the testing phase of the system. Therefore, the main idea of testing is to demonstrate the correctness of the program, identifying the error in the system coding or system design that caused the faults if there are failures that happened in the system during testing procedures. Once the errors or mistakes has been found during the testing procedure, steps has to be taken to correct them later on, so that a robust system will be able to be produced.

The testing method and procedure of a system depends on a number of things. One of the things that need to be considered is the size of the system. Systems, which are small and consist of programs that are not complicated, could be tested as a single monolithic unit. Systems, which are huge in forms of application, should not be tested as a single monolithic unit. As for *Student Management System*, the testing was not approached as a single monolithic unit. Large and medium sized systems are built out of sub-systems that are built out of modules, which are composed of procedures and functions. Medium sized systems like *Student Management System* are therefore tested as sub-system, where each module and all the command buttons will be tested to ensure a good programming approach has been taken in developing it.

The testing procedure for *Student Management System* should therefore proceed in stages. This is where the testing would be carried out incrementally in

University of Malaya

conjunction with the system implementation phase. Like any other normal system testing procedure, *Student Management System* testing stages involves the most widely used testing processes. The testing processes involve a total number of five stages. The stages are: -

- Unit testing
- Module testing
- Sub-system testing
- System testing
- Acceptance testing

These five stages are described and shown in Figure 6.1. In general the sequence of the testing activities are as follows:

- Component testing
- Integration testing
- User testing

The sequences of the testing stages are very important as it help the testing procedure to be conducted in a very matter of fact and direct way. However, as defects, errors or even a small faults are discovered at any one stage, program or coding modifications are required to correct them and this

University of Malaya

might require other stages in testing process to be repeated. Once the stages has been repeated, this will eventually lead to a system that has been tested numerous time and the testing is said to be successful if all the errors or defects has been corrected before it is given to the user.

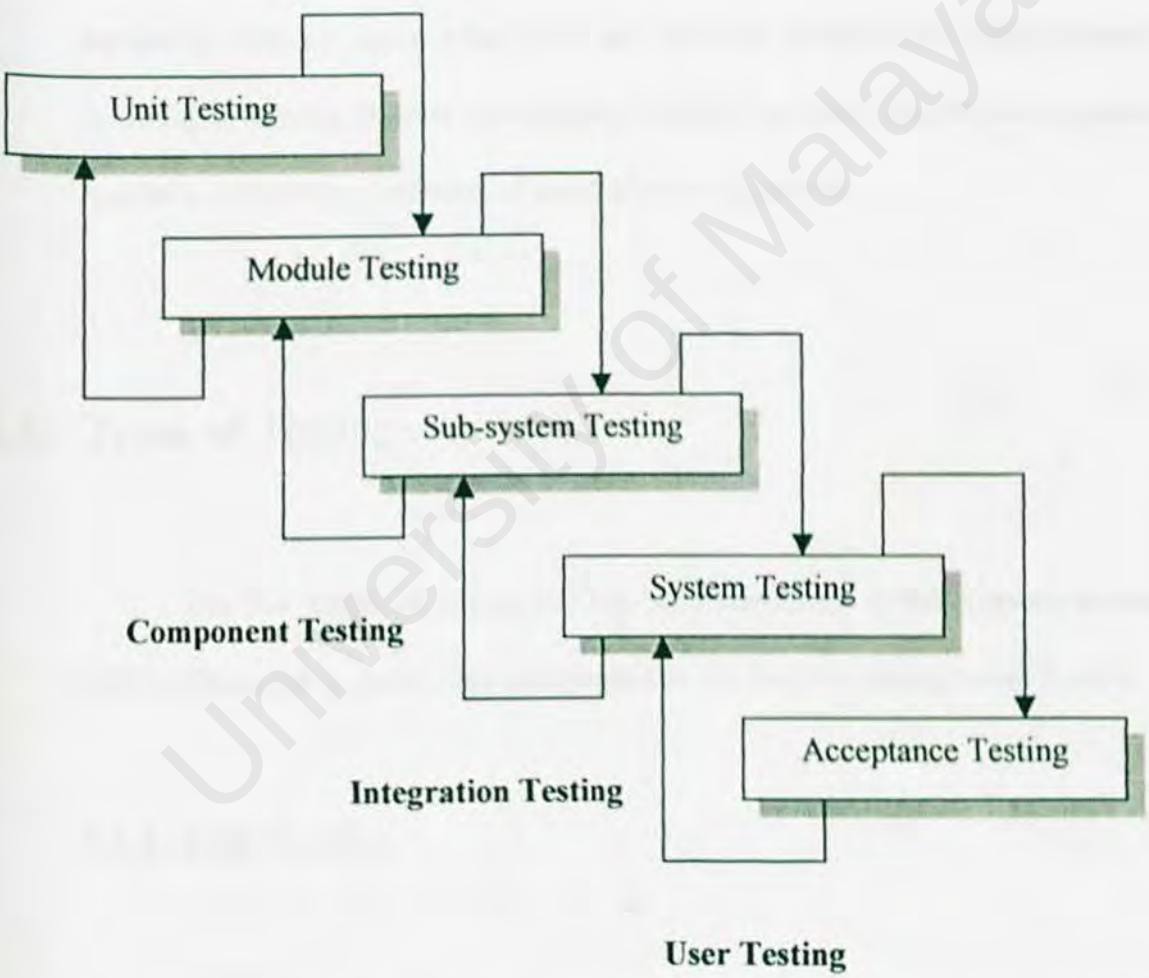

Figure 6.1. Testing Stages

University of Malaya

The testing stages of *Student Management System* start with a few first initial testing. It will start with the testing procedure of the smallest component unit. In this bottom up testing method, each unit at the lowest level of the system hierarchy is tested individually first. The next components to be tested are modules, which consists of several units. These approaches are followed repeatedly until all larger components are included in the testing. This approach is useful in testing *Student Management System* because *Student Management System* is integrating a number of stand-alone components.

6.2. Types of Testing

The five stages of testing that has been mentioned in the previous section will be discussed in detail here with regard to the *Student Management System*.

6.2.1. Unit Testing

Unit testing focuses verification effort on the smallest unit of software design – the software component or module. Using the component-level design description as a guide, important control paths are tested to uncover errors within the boundary of the module. The

University of Malaya

relative complexity of tests and uncovered errors is limited by the constraint scope established for unit testing. Tests of data flow across a module interface are required before any other test is initiated, if data do not enter and exit properly; all other tests are moot.

For the unit-testing phase, the database that has been designed would be tested for number of reasons. The database plays a very important role in the development of the system. The database could be considered as the backbone of the system to manipulate data. The database should be tested as a whole unit. Among the potential errors that should be tested are such as: -

- Incorrect initialization
- Precision inaccuracy
- Comparison of different data type

Other than the database, the command buttons to should be tested. The entire command button actually consists of extensive coding. A small mistake may cause a whole system to crumble. Among the more common errors in computation coding are: -

- Incorrect arithmetic precedence
- Mixed mode operations

University of Malaya

- Incorrect symbolic representation of an expression

6.2.2. Module Testing

A module is a collection of dependent components such as an object class, an abstraction data type or some looser collection of procedures and functions. A module encapsulates related components. Therefore it can be tested without other system modules. In *Student Management System* there are overall 7 modules. The modules consist of Academic club, Hobby club, Uniform unit, Sports, Hostels, School leaving certificate and testimonial.

6.2.3. Sub-system Testing

The sub-system-testing phase involves testing collection of modules in *Student Management System*, which have been integrated into subsystems. Subsystems may be independently designed and implemented. The most common problems that arise in large software system are sub-system interface mismatches. The sub-system test process

University of Malaya

should therefore concentrate on the detection of the interface errors by rigorously exercising the interfaces.

6.2.4. System Testing

System testing is actually a series of different tests whose primary purpose is to fully exercise the computer-based system. The sub-systems in *Student Management System* are then integrated to make up the entire system. The testing process is concerned with finding errors, which result from unanticipated interaction between sub-systems and system components. It is also concerned with validating that the system meets its functional and non-functional requirement.

6.2.5. Acceptance Testing

This is the final stage in the testing process before *the user accepts Student Management System.* Acceptance testing reveals errors and omission in the systems requirements definition. This is because the acceptance testing involves testing from the user. During the acceptance test, the functionality of *Student Management System* is demonstrated to

University of Malaya

the users or the users themselves may experience it. It helps to reveal requirement problems where the system's facilities do not really meet the user's needs or the system performance is unaccepted.

Unfortunately, till the end of this documentation, acceptance testing has not been done in proper accordance because of time constraint. A few problems have been encountered during the implementation phase of the *Student Management System*, so there has been a delay in the aspect of acceptance testing.

6.3. Summary

The objective of software testing is to uncover errors. To fulfill this objective, a series of test steps – unit, integration, validation and system tests – are planned and executed. Unit and integration tests concentrate on functional verification of a component and incorporation of components into a program structure. Validation testing demonstrates trace-ability to software requirements, and system testing validates software once it has been incorporated into a larger system.

University of Malaya

Overall it could be said that the main reason for the testing to been done has been fulfilled expect for acceptance testing. For acceptance testing course-mates and friends have given guidance on the feasibility of the interface and the testing procedure for the command buttons. In the next chapter discussion will be about the system evaluation.

University of Malaya

SYSTEM EVALUATION

7.1. Introduction

Throughout the system development life cycle, the system developers and the system users have been evaluating the evolving information systems and networks in order to give feedback for their eventual improvement. Evaluation is also called for following system implementation.

In recognition of the fact that the ongoing evaluation of information systems and networks is important, many evaluation techniques have been devised. These techniques include cost-benefit analysis; models that attempt to estimate the value of a decision based on the effects of revised information using information theory; user evaluations that emphasize implementation problems and user involvement; and information system utility approaches that examine the properties of information. Each type of evaluation serves a different purpose and has inherent drawbacks.

University of Malaya

7.2. Problems and Solutions

As this system has to be developed within a short span of time and a lot of technical issues need to be resolved, a number of problems have been encountered. Solutions have been sought during the testing phase and reference check with course-mates was taken as preventive measures to avoid any unwanted mistakes. An encounter with these problems has been proven to be a valuable learning experience.

1) **Difficulty in choosing a program language.**

There is much programming language available in the market, which can be used to develop a system. To determine which approach to use, advice and views were sought from the project supervisor and course-mates engaging in similar projects. After much reference, studies and survey Microsoft Access 2000 and Visual Basic 6 are chosen prior to the short time span available to develop *Student Management System*. Therefore both the software will be the most suitable language as it incurs shorter learning curves.

2) **Lack of experience in Visual Basic programming**

During the implementation phase for the *Student Management System*, a lot of studies have been carried out. Extensive reading on both the software has

University of Malaya

been done. A lot of time has been spent in mastering the new language since it is a new language for me. Steps that have been taken to overcome these problems are by purchasing reference books for Microsoft 2000 and Visual Basic 6.

3) Determining Project Scope

As this involves developing a system, to build a fully-fledged system is merely impossible within the given time frame. Inexperience with the language technologies and particular coding approach is another hindrance to implement the system.

4) Lack of resources

Only one book has been purchased for both the languages that is being used. Since reference is an important aspect to build a good system, this reference is not enough. But other reference books could not be bought because the books are very expensive. Reference books could not be found at the library since the books are not up to date. The books are older version of Visual Basic. This problem has been overcome by going through a number of web-sites that has been developed to assist students in Visual basic programming problems.

University of Malaya

5) Hardware limitations

At first the system was developed at the lab provided for the third year students, but later on I had to use my own PC to develop the system because of time constraint. There was no problem that was encountered in the development of the system at the lab. But once the development took place using my own PC, there was a number of problems that have been encountered such as the screen resolution, memory capacity of the hard drive and the time lag when compiling the system. These problems were resolved by cleaning my hard disk and reinstalling a number of programs again.

6) Consideration on other subjects

Other subjects that I have undertaken for my second semester had to be given considerations too. I had problems to balance works with the development of my system with assignments and studying other subjects. So far I have managed to complete the other subject's assignment successfully and in the same time build *Student Management System*.

7) Difficulty in database linking

There was a problem in linking the Microsoft Access 2000 database with the Visual Basic user interface. In the end the database that was created using

University of Malaya

Microsoft Access 2000 was converted to the prior version of Access that is Access 97.

7.3. Evaluation by End-users

Evaluation by users is a very important aspect in the system's feasibility. If the system is not well versed and is complicated to understand, the users will find it hard to accept the system. This is because the system was built to help the end-users in their management of data. This aspect is also important as it gives a positive and negative feedback regarding the system that has been produced. The evaluation will enable the system developers to enhance the system that is being built. This will enable a robust and appealing interface to be built for the user.

All systems that are being developed require feedback in order to monitor and change behavior in the later process after the evaluation phase. Evaluations will usually compare the system's current ability with the predetermined goals that was set before the system was being developed. This evaluation will give back information describing the gap between actual and intended performance.

As for the *Student Management System*, the evaluation is equally important by the users who will be using it, that is the school administrator and

also teachers. Unfortunately, for *Student Management System* the evaluation did not take place with school administrator and teacher because of time constraint. Though, the evaluation was done by a few of my course-mates and a few teachers who are now furthering their studies in University Malaya. The have given positive and negative remarks upon the presentation of *Student Management System.*

Among the positive remarks are: -

- The flow of the interface are easy to understand
- Appealing user interface
- Generation of testimonial
- Data storing in an easy way

Among the negative remarks are: -

- Clustered command button
- Command button is confusing

Overall, it could be said the evaluation have generated a positive feedback in view of the system's capabilities. The system has been enhanced after the evaluation. Before this there was only three-command button, that was Tambah, Padam and Simpan Rekod, but now it has seven additional command

University of Malaya

buttons. The functions of the command button will be discussed in much detail in the user's manual.

7.4. System Strength

During the course of the system development, several system strength has been identified. These strength will undoubtedly serve the system well should it be eventually used.

1) Password Protected

By giving authorized user ID and password, unauthorized users are prohibited from accessing unnecessary records stored in the database. This will also prevent intruders from intentionally or unintentionally causing vast damages to the system.

2) System Transparency

System transparency refers to the condition where the users do not need to know where the database resides, how is the system structure and anything related to the building of the system.

3) Report Generation

University of Malaya

This function has been built in *Student Management System*, which enables the administrator to preview or print the relevant report.

4) User-Friendly

The interface that has been created for *Student Management System* is attractive and easy to use. GUI components such as command button; combo box and bar scroll has been implemented, where necessary and possible to enhance the look and feel, this is done so that the user will feel comfortable using the system.

5) Efficiency

The users are no longer encumbered with a whole lot of paperwork and such. Everything is done electronically. Processes are more direct, where this has resulted in an increase in efficiency.

6) Scalability

By just transferring the necessary data files and making new configuration changes, the system can be easily set up at any PC that fulfills the system requirements.

University of Malaya

7.5. System Constraints

The limitations of the system are as discussed below:

1) **Lack of Help Module**

Help module is most definitely the most desirable feature. However this was not implemented in the system due to the time constraint.

2) **Inability to generate sports house for students**

Sports house, are not generated automatically by *Student Management System,* but it has to be divided by the administrator when keying in data depending on certain aspects. It is not able to balance the students in the sports house based on their sex and race.

3) **Stand alone system**

The *Student Management System* is a stand-alone system and is not client server architecture. This is a weakness that needs to be adjusted. If the system is client server architecture, only one PC (the server) have to be installed with the system and the rest of the PC will serve as the client. For now, only a few PC could be installed with the stand-alone system.

University of Malaya

7.6. Future Enhancement

There are a numbers of enhancements that need to be done to create a much more desirable *Student Management System*. There should be a help module created for the convenience of the users. This is necessary for the users, as it will guide them if there are facing any question regarding the system. The system should also be able to generate sports house and not by keying them in. the sports house should be generated by considering the student's sex and their race, but this was not implemented in *Student Management System* because lack of mastery and also time constraint. It would complete the system if these features could be developed and implemented.

7.7. Knowledge and Experience Gained

There are a numbers of experiences that has been gained during the phase of the *Student Management System* development. One of them is the knowledge that was obtained regarding Visual Basic language. Prior to this, I do not have any knowledge on this language, but I managed to learn a new language. Other than that, I was also able to work under stress, where a certain date line has to be met. Besides that my communication skills improve since I had to take the

University of Malaya

initiative to ask and learn about the coding approach and few errors messages that I got from the system. Help has been rendered to me by my friends and a few seniors in debugging the errors. I also learnt a lesson in how valuable time is, since I was struggling to make ends meet on the date line that has been imposed. Overall, it could be said that the development of the system has helped me a lot in managing time carefully.

7.8. Summary

This chapter contains all the information regarding the evaluation of the system by the developers and also by the end users. This chapter also discusses about the system strengths and system limitations in view of the system developers. The knowledge and experience that has been gained out of the development of this system could also be seen in this chapter. The next section will consist of the user manual of *Student Management System*.

University of Malaya

7.9. Conclusion

Overall, it could be said that *Student Management System* has been completed successfully, even though there are a few limitations in the system. *Student Management System* is a tool that will ease the burden of paperwork of the school administrator and teachers. It is really expected that the system will create a difference in the management system in the secondary schools.

University of Malaya

REFERENCES

1) The University of Chicago Press, "**The Chicago Manual of Style**", Fourteenth Edition, 1993.

2) Kementerian Pendididkan Malaysia, "**Laporan Tahunan 1995**", Kementerian Pendidikan Malaysia, 1995.

3) Kementerian Pendididkan Malaysia, "**Report of the Cabinet Committee: To Review the Implementation of Education Policy**", Berita Publishing Sdn. Bhd., 1985.

4) Ralph M. Stair, "**Principles of Information System, A Managerial Approach**", 2nd Edition, Boyd and Fraser Publishing Company, 1996.

5) Thomas Connolly, Carolyn Begs, Anne Strachan, "**Database System – A Practical Approach to Design, Implementation and Management**", Addison-Wesley Publishing Company Incorporated, 1996.

University of Malaya